

*REMARKS*

In response to the Office Action dated June 29, 2004, Applicant requests reconsideration. No claims are added or cancelled so that claims 1-16 remain pending.

Claims 2-15 are indicated as allowable.

The Priority Document was filed simultaneously with the patent application on February 6, 2002. According to the image file wrapper accessible through the PAIR System, the priority document is present in the file. Acknowledgement of receipt of the priority document in the next Communication is respectfully requested.

At the time of filing the patent application on February 6, 2002, an Information Disclosure Statement was filed along with copies of three patent publications and three non-patent literature publications. The Information Disclosure Statement and these publications are of record in the patent application according to the image file wrapper. Acknowledgement of receipt and consideration of these publications by return of the initialed PTO-1449 form included with the Information Disclosure Statement in the next Communication is respectfully requested.

Claim 1, the only pending independent claim, was rejected as obvious over Shiga (U.S. Patent 5,416,660) considered by itself. This rejection is respectfully traversed.

As explained clearly in the patent application, the invention is directed to a semiconductor device that incorporates protection against electrostatic discharge. The protection is provided along a signal transmission line that connects an input/output pad to an internal circuit of the semiconductor device. An important feature of the invention, expressly described in claim 1, is the connection at two respective nodes along that transmission line of two different elements for suppressing electrostatic discharge and its damaging effects. First, a bypass transmission line is connected at a first node of the transmission line, between that transmission line and a first power supply node, shown as a ground 14 in the embodiment of Figure 1 of the patent application. At the second node of the transmission line, at a location closer to the internal circuit than the first node, along the transmission line, a first surge conducting element is connected. That first surge conducting element is connected between the second node and the first power supply node. That first surge conducting element conducts a signal when the voltage rises above a threshold voltage at the first node.

An important feature and advantage of the invention as described and claimed in the patent application is the ability to protect a circuit against the surge of an electrostatic discharge commonly described as the Charge Device Mode (CDM). In this mode, the discharge has a waveform with a steep rise at the frequency at which the internal circuit is intended to operate. This waveform includes a strong frequency component at the frequency

of desired operation, i.e., the high frequency signal of claim 1. Therefore, if the bypass transmission line of claim 1 is a one-quarter wavelength transmission line, as in the structure claimed in claim 16, the CDM mode cannot pass directly to ground merely through that bypass transmission line. In the invention, this problem is solved by providing the first surge conducting element along the transmission line but closer to the internal circuit than the bypass transmission line. This first surge conducting circuit, which might be a normally-off MOS transistor, provides the additional needed protection against a CDM surge.

Shiga concerns an arrangement of a package for an integrated circuit so that the integrated circuit can be alternatively connected between input and output connections of the package. In the first alternative arrangement, an electrostatic discharge protection circuit is ignored and not connected. In the second, alternative arrangement, the electrostatic discharge circuit is connected between the input and output lines. In effect, when any of the electrostatic discharge circuit arrangements of Figures 3-7 of Shiga are connected, they are connected only at a single node of a transmission line that connects the input terminal of the package to the output terminal of the package. The node is identified as element 11 in those Figures 3-7 of Shiga, while reference number 3 in Shiga is said to refer to an input terminal. However, as clearly indicated in those figures, reference number 3 identifies a signal transmission line that corresponds to the signal transmission line of claim 1.

While Shiga describes various electrostatic discharge circuits including quarter wavelength lines, diodes, and transistors connected as diodes, it is apparent that there is only a single connection, i.e., at the node 11, of each electrostatic discharge protection circuit to the transmission line in Shiga. In other words, referring to the language of claim 1, both the bypass transmission line and the surge conducting element of the various circuits of Shiga are all connected, at different times, to the same node of the signal transmission line. There is no suggestion in Shiga for providing a second circuit or dividing in any way any of the protection circuits of Shiga so that two connections are made from those protection circuits to the respective nodes of the signal transmission line. Without such a suggestion, there can be no basis for properly asserting that one of skill in the art would, from Shiga alone, find a suggestion for providing an electrostatic discharge circuit, as in the invention defined by claim 1, including two different kinds of protecting elements connected at different nodes of the signal transmission line. Thus, *prima facie* obviousness cannot be established with respect to claim 1 based upon Shiga alone and the rejection is erroneous.

Moreover, Shiga cannot, like the claimed and disclosed invention, provide good protection against the CDM surge. Of the many protection circuit embodiments described by Shiga, all include a transmission line 8 connected in parallel to the signal transmission line 3.

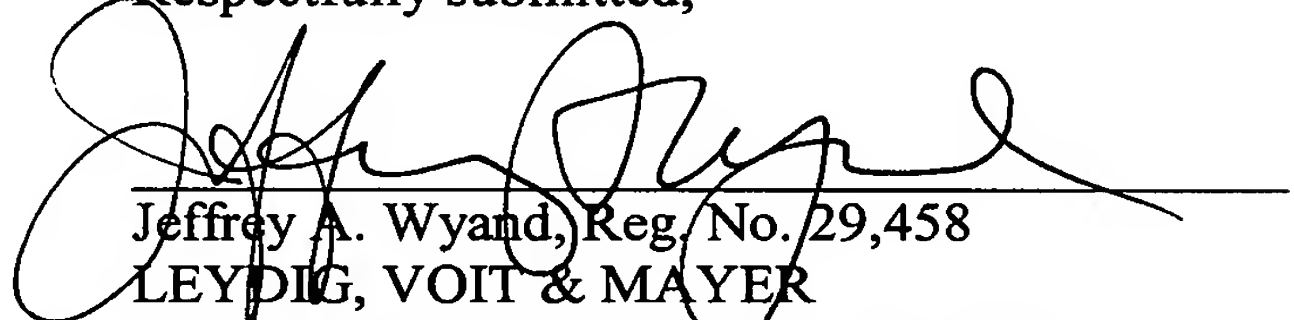
In re Appln. of Takahiro OHNAKADO  
Application No. 10/066,608

The bypass transmission line 8 of Shiga is connected to ground through at least one diode. If the bypass transmission line 8 in Shiga is a one-quarter wavelength line, then the series circuit of the diode and the one-quarter wavelength line have a high impedance at the operating frequency of the internal circuit and provide good protection against electrostatic discharge with regard to frequency components other than that operating frequency. However, the protection circuits described by Shiga cannot provide a conducting path to ground for a CDM surge that has a steeply rising waveform at the operating frequency. In other words, the technical advantage produced by the invention as disclosed in the patent application cannot be achieved by the protection circuits described by Shiga. For this additional reason, there is no suggestion in Shiga for the invention as defined by claim 1 so that the rejection of claim should be withdrawn.

In this response, no claim is amended. Thus, if a new rejection is made based upon newly applied prior art or a different legal ground, the rejection cannot properly be a final rejection.

Reconsideration and allowance of all of claims 1-16 are appropriate and earnestly solicited.

Respectfully submitted,



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Amendment or ROA - Regular (Revised 6/5/04)